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1974



Proposed
Upper Stryker Ridge
Timber Sale

DRAFT ENVIRONMENTAL IMPACT STATEMENT

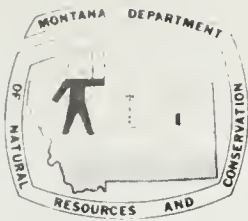
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April 15, 1974

Following is the Draft Environmental Impact Statement for the proposed sale of commercial timber near Olney, Montana. This administrative action, the Upper Stryker Ridge Timber Sale, has been proposed by the Department of Natural Resources and Conservation, Division of Forestry. Preparation of this Draft Environmental Impact Statement was done in compliance with the Montana Environmental Policy Act, Section 69-6504 (b) (3) and was submitted to the Environmental Quality Council on April 15, 1974.

Forest resource management decisions often have extensive and significant economic impacts and implications. Furthermore, economics can have significant implications for forest management decisions. Traditional economic values have always weighed heavily in forest management decisions, although complete and formal analyses have generally not been made. Recognizing this short-coming we have included the first formal economic analysis to be prepared in conjunction with a Division of Forestry Environmental Impact Statement. Constructive review comments on this section are requested as an aid to improving later analyses.

I would encourage you to carefully review this statement and invite your response. Any written comments that you might have should be submitted to me by May 15, 1974. Upon request, a fifteen-day extension of this deadline will be provided. If a final impact statement is prepared, your written comments will be included.

Sincerely,

GERHARD M. KNUDSEN
ENVIRONMENTAL COORDINATOR





DRAFT ENVIRONMENTAL IMPACT STATEMENT

PROPOSED

UPPER STRYKER RIDGE TIMBER SALE

Prepared by

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

Division of Forestry

Submitted pursuant to:

Montana Environmental Policy Act

Section 69-6504 (b) (3)

April, 1974

I. INTRODUCTION

Among the tools used by the Montana Division of Forestry in the management of State-owned commercial forest land is the sale and harvest of timber and other forest products. Such operations allow the composition and condition of existing forest stands to be improved by removing mature, overmature, diseased and/or damaged trees. In addition to reallocating growing space to the more desirable trees in a stand, harvesting of timber and other forest products leads to the establishment of new forest stands in those areas where an inadequate understory stand exists.

Forest management practices on State forest land utilize a wide variety of silvicultural systems and involve the clearcutting, seed tree, shelterwood and selection methods. The choice of silvicultural system is based on the planned management program for the area, the particular conditions which exist within that area and the ability of a given silvicultural system to achieve the desired future stand composition.

Timber and other forest products are a major benefit derived from State forest lands. Over the last five years, a yearly average of 30.329 million board feet of timber has been harvested from the 421,309 acres of State-owned commercial forest land. This average yearly harvest is currently below the average annual allowable cut estimated for State forest land, which is based on the present intensity of management and currently set at 35 million board feet.

Existing State statutes, the State Land Board and the Board of Natural Resources and Conservation provide direction for the management of the various resources on State-owned lands so that they are protected and utilized in the combination which best meets the needs of the people and the beneficiaries of the trust. This direction permits a wide variety of alternatives for the management of the specific area considered in this statement.

II. DESCRIPTION OF ACTION INDICATING THE GEOGRAPHICAL AREA OR POLITICAL SUBDIVISION THAT IS PARTICULARLY AFFECTED

The proposed Upper Stryker Ridge Timber sale is a major development sale and will initiate more intensive forest management of the area within the general sale boundary. The action consists of the sale and commercial harvest of approximately 4.6 million board feet of timber from a 1,380-acre general sale area which is located 17 air miles north northwest of Whitefish, Montana. The specific location and boundaries of the proposed sale area are shown on the appended reference maps (See Appendix A). Careful study of these maps will assist the reader in understanding the proposed action.

Previous road construction and harvesting activities within this area have involved construction of the Stryker Ridge Road by the Civilian Conservation Corps during the early 1930's, and several small sales have resulted in the clear-cut harvesting units and spur roads shown on the reference map. In addition, several other small sales have been carried out within the area for the purpose of salvaging scattered blowdown trees.

The proposed sale will involve 19 small harvest units ranging in size from 2.5 to 18 acres, with the average size being approximately 9 acres. An average volume of approximately 24,000 board feet per acre will be removed from the 170 acres of harvest units.

The existing forest stands, the presence or absence of a manageable understory, the physical location of these stands and the management direction of the land management agency play a large part in determining the silvicultural system or systems to be used. The term "silvicultural system" designates a planned program of silvicultural treatment to be carried out during the entire life of a stand. It includes the removal of the old stand, the establishment of the new one, and any supplementary treatment of the understory vegetation, slash and soils for the purpose of providing favorable conditions for tree reproduction. A system also includes any intermediate cuttings that may be required. Reduced to its essence, a silvicultural system is a number of logical steps to initiate and maintain a forest stand to maturity.

Three methods of reproduction which result in even-age stands are to be used on the proposed Upper Stryker Ridge sale. These are:

1. Clearcutting Method: The removal of the entire stand in one cutting with reproduction obtained artificially or by natural seeding from adjacent stands.
2. Seed tree Method: The removal of the mature timber in one cutting, except for a small number of seed trees left singly or in small groups (units with an average of two to ten leave trees per acre).

3. Shelterwood Method: The removal of the mature timber in a series of cuttings, which extend over a relatively short portion of the rotation. The establishment of essentially even-aged reproduction is encouraged under the partial shelter of the remaining seed trees.

Each unit designated for harvest was marked on the basis of the most efficient and appropriate method to naturally regenerate a new forest stand.

The units to be harvested by each silvicultural method and the total acreages included are give below:

<u>Units</u>	<u>Number</u>	<u>Silvicultural Method</u>	<u>Total Acreage</u>
1, 2	2	Shelterwood	20.4
6, 9, 11, 13, 15, 17, 19	7	Seed Tree	63.0
3, 4, 5, 7, 8, 10, 12, 14, 16, 18	10	Clearcut	86.2
			169.6

Road construction, improvement and maintenance activities will begin at the junction of the existing Upper Whitefish road and U. S. Highway 93 opposite the Olney turnoff and will proceed into the sale area. These activities will consist of the following:

1. New roads will be constructed over 7.8 miles, 7.2 miles of which consist of secondary haul roads and .6 miles which consist of temporary spur roads.
2. Widening, ditching and the placement of five culverts will improve 1.1 miles of existing road to secondary haul road standards. These improvements will also include minor alignment and grade changes.
3. Road resurfacing (ripping roadway where large boulders are exposed, placing of approximately six inches of gravel and regrading of the road surface) will be done over 9.0 miles of existing road, requiring the placement of approximately 18,240 cubic yards of gravel from a 2.5 acre site located in SE $\frac{1}{4}$, NE $\frac{1}{2}$ Section 14, T33N, R23W. The purchaser will be required to prepare a reclamation plan and enter into a written agreement with the State Board of Land Commissioners as provided for in Montana's Open Cut Mining Act.
4. As a dust abatement measure, not less than 2500 gallons per mile of Forest Service Dust Oil (Fuel Oil, number 5 grade) will be evenly

dispersed over the roadway surface. If unavailable, other dust abatement procedures will be used.

Constructing and improving roads to secondary haul road standards provides for a running surface width of 14 feet and a turnout width of 20 feet. Turnouts will be spaced as necessary. Road specifications further provide for a minimum curve radius of 100 feet (except 60 feet on switch backs), maximum favorable road grade of six percent (5 percent adverse) ^{1/} and a 20 foot clearing width from centerline on side slopes from 0 to 20 percent (25 feet on side slopes of 20 to 40 percent).

Road specification for spur roads for this sale are the same as for secondary haul roads with the exception of reduced clearing widths. All spur roads will be physically closed after management activities have been completed.

All roads and cut slopes within the proposed sale area will be stabilized with appropriate mixtures of grasses after sale activities have been completed.

An additional 48 acres will be included within the right-of-way necessary for road construction and improvement. Complete clearing within this 48 acres will be confined to the approximate 26 acres comprising the actual roadway. Right-of-way slash will be disposed of by the following methods:

1. windrowing in a uniform, compact pile and burying along the toe-line of the road fill slope
2. scattering outside the road prism, or
3. piling and burning within the road clearing width.

The actual harvesting operation will be carried out by crawler tractors or rubber-tired skidders. Specific provisions will be provided in the timber sale contract as a means to prevent unnecessary damage from tractors and other heavy equipment. Established skid trails, where necessary, will be limited to grades of 25 percent; adequate erosion protection measures will be taken immediately after use ceases. The purchaser will be required to install rolls, cross ditches or outsloping in road beds, fire lanes and skid trails to prevent soil erosion prior to completion of a particular logging unit. When operations on a unit are suspended before harvesting is complete, the purchaser will be required to install temporary erosion control measures. Log landings will be located on short spur roads within the boundaries of designated harvest units and placed no closer than 100 feet from any main road.

The total sale volume consists of 4.633 million board feet, which represents the volume removed from within the harvest units and the rights-of-way

^{1/} If a loaded truck must haul uphill, the grade is adverse. A favorable grade is the converse.

of all new roads. For ease of reference the volumes of the individual tree species to be harvested are given below:

<u>Species</u>	<u>Net Volume (Thousand Board Feet)</u>
Western white pine	466
Douglas-fir	1,096
Western larch	1,432
Engelmann spruce	916
True firs (sub alpine fir and grand fir)	315
Western red cedar	36
Whitebark pine	70
Lodgepole pine	281
Dry Douglas-fir	3
Dry western larch	8
Dry Englemann spruce	10
	<u>4,633</u>

To provide a scarified mineral soil seedbed and facilitate natural regeneration, the method of slash disposal proposed for this sale will be dozer piling and burning. Dozer piled concentrations of logging slash will be burned in the fall under unstable atmospheric conditions as a means to facilitate smoke dispersion and minimize the risk of creating an uncontrolled fire situation.

In accordance with State law and established administrative procedures, this sale will be advertised and the timber sold by sealed bid to the highest bidder. Bids less than the appraised value of the timber will not be accepted. Upon award of the timber sale, the successful bidder will be required to enter into a written timber sale contract which specifies the conditions of sale, special harvesting requirements and procedures to be followed.

III. EXISTING ENVIRONMENT

A. Physiography

The proposed sale area covers the major ridge between Antice and Dog Creeks, commonly referred to as Stryker Ridge. Antice Creek is to the northeast of the area and Dog Creek is to the southwest. Elevations within the harvest units range from 4,840 to 5,640 feet.

All topographical aspects are present, with southwest and northwest aspects generally characterizing the majority of harvest units. Slopes within harvest units are generally moderate (20 to 40 percent) with occasional short pitches approaching 50 percent. A general view of the proposed sale area from the southwest is presented in Appendix B, photo 1.

The present surface configuration of the sale area has been determined by the uplifting of underlying bedrock and repeated glaciation. As a result, both deep soils and occasional rock outcrops are found within the general sale area.

No lakes or perennially flowing streams are found within the general sale area with the exception of a perennial stream in Section 18. Mystery Lake, a small, beautiful mountain lake, is located approximately .7 mile from proposed harvest unit number 18.

B. Soils and Geology

No detailed Soil Conservation Service soil surveys have been made in the area under consideration. A soil reconnaissance was conducted by the Forestry Division's soil scientist.

Within the sale area, soils can be generally described as shallow to deep and well-drained over precambrian quartzite and argillite with occasional interbedding of limestone. The parent materials from which the existing soils have developed are primarily calcareous, glacially-deposited materials from the Continental, Cordilleran and possibly other glaciations. As a result, soils textures are variable, ranging from silts to fine sands with occasional small pockets of silts and clays.

The presence of coarse fragments, rocks and cobbles within the soils (estimated at 35 percent) tends to reduce the erosive nature of these soils. As a result, the general erosion hazard of the area was judged to be moderate if potential problem areas (pockets of silts and clays) are avoided and erosion control measures taken.

C. Vegetation Resource

During September of 1972, a detailed investigation of the forest associations within the general sale area was made and the area classified according to the Habitat Type Classification System proposed for Western Montana by Pfister, et. al. 2/ These habitat types are delineated upon the appended reference map. (See Appendix A)

The following five habitat types (h.t.) occur within the proposed sale area:

1. Pseudotsuga menziesii/Calamagrostis rubescens h.t. (Douglas-fir/pinegrass). This habitat type, which is not included in any harvest unit or road right-of-way, was found on only one 30-acre area within the general sale boundary. This habitat type, which is characterized by thin, rocky soils and a "heavy" understory stand of pinegrass and elk sedge (Carex geyerii), constitutes the only area of important winter game range within the general sale area.
2. Thuja plicata/Clintonia uniflora h.t. (Western red cedar/queencup beadlily). This habitat type occupies lower and mid-slopes on both southwesterly and northeasterly aspects with upward extensions into the Abies lasiocarpa/Clintonia uniflora h.t. in cool moist draws. The characteristic Clintonia uniflora union of understory species is well-represented on all plots examined in this habitat type. Existing overstory stands contain a high percentage of overmature western red cedar, western white pine, sub-alpine fir and Engelmann spruce; individual western hemlock, Douglas-fir, western larch and grand fir are occasionally present. Productivity of this habitat type for tree growth is above average for all species measured.
3. Abies lasiocarpa/Clintonia uniflora h.t. (Sub alpine fir/queencup beadlily). This is the mildest (warm and moist) habitat type within the sub-alpine fir climax series. Within the proposed sale area, this habitat type covers moist slopes, benches and stream bottoms of westerly and northeasterly aspect. A phase of this habitat type (the Abies lasiocarpa/Clintonia uniflora h.t., Menziesia ferruginea phase) was specifically recognized and mapped due to the presence of heavy fool's huckleberry stands. A greater degree of dozer scarification will be needed to prevent the development of a brushfield after harvest. The present overstory stands on this habitat type consist of mature to overmature Douglas-fir, western larch, Engelmann spruce, western white pine and sub-alpine fir. Sites within this habitat type are average to above average in productivity.

2/ Pfister, R.D., S. F. Arno, R. C. Presby and B. L. Kovalchik. 1972. Preliminary Forest Habitat Types of Western Montana. Report prepared for the U. S. Forest Service, Region 1 habitat type training session May 22-26, 1972 at Missoula, Montana. 75 p., illustrated.

4. Abies lasiocarpa/Xerophyllum tenax h.t. (Sub alpine fir/beargrass). This is the dryest habitat type of the sub-alpine fir climax series and occupies the relatively steep and dry, south- and southwest-facing slopes. Moderately heavy understory stands of beargrass (50 to 75 percent coverage) are present in all stands of this type examined. Existing overstory stands on this habitat type contain a high percentage of mature to overmature sub-alpine fir, Engelmann spruce, lodgepole pine, and western larch. Whitebark pine and western white pine are occasionally encountered. Productivity of these sites is generally low due to a limiting moisture situation which exists during July and August.

5. Abies lasiocarpa/Menziesia ferruginea h.t. (Subalpine fir/fool's huckleberry). This habitat type, which is indicative of the cool and moist sub alpine fir zone, is present only as isolated patches in small saddles or flats along the main ridge. Plots examined within this habitat type area contain high individual species coverage of fool's huckleberry (75 to 95 percent) and mountain alder (Alnus sinuata) (25 to 50 percent). Merchantable timber stands within this habitat type consist of a high percentage of mature to overmature subalpine fir, Engelmann spruce, western larch, western white pine, lodgepole pine and whitebark pine. Productivity of this habitat type for timber production is above average if brush control measures are employed to facilitate tree regeneration.

In connection with this proposed sale, a comprehensive timber inventory was carried out only in those areas designated for harvest.

D. Climate and Hydrology

The sale area is located in a region characterized by high precipitation and runoff; the majority of the precipitation comes in the form of snow. Precipitation ranges from about 40 to more than 50 inches annually. Annual runoff averages from 17 inches to more than 25 inches.

The proposed sale area was examined by a forest hydrologist employed by the Division of Forestry during the sale planning process. On the basis of the average to good site index, the intensity of harvest, and unit size and location, it was concluded that an increase in water yield of 30 to 35 percent will result from the seed tree and shelterwood harvest units; an approximate 40 percent increase will result from the clear cut units and roads. This significant increase in total water yield will be modified somewhat by the varied topographical aspects involved, which will result in a spreading of the increased yield throughout the runoff period.

Five well-defined drainages within the sale area were further studied as a means to determine possible increases in maximum peak flow below the sale area. Increases in maximum peak flows from these selected drainages will range from 2.5 to 8.5 percent the first year following cutting. These peak flows are anticipated to decrease each successive year until evapotranspirative recovery from regeneration is complete, probably in 25 to 30 years.

E. Fish and Wildlife

A detailed wildlife and fisheries inventory within the proposed sale area was not undertaken in connection with the sale preparation. However, the potential impacts of the proposed sale upon wildlife and fisheries were reviewed on the ground with a representative of the Montana Department of Fish and Game.

The area is the summer range of deer, elk and black bear with an occasional sighting of a Grizzly bear. Deep winter snows, heavy concentrations of understory trees and shrubs and large amounts of forest debris limit the suitability of the proposed sale area for winter big game range; the possible exception is the small Douglas-fir/pinegrass habitat type area located in the SW $\frac{1}{4}$, SE $\frac{1}{4}$ of Section 21.

The small intermittent streams in the sale area drain into Antice and Dog Creeks which support native cutthroat trout fisheries. The small, scattered harvesting units and road systems are expected to have very little effect upon the fisheries of these areas.

F. Human Use of the Area

The earliest recorded timber harvesting on the area occurred during 1922 and 1923, when 527 cedar poles were harvested. Since that time, a total volume of approximately 3.463 million board feet of timber has been harvested from within the general sale area boundary through a few large sales and numerous timber permits. This harvesting has occurred almost entirely in that portion of the area drained by Antice Creek.

Recreational use by the general public is limited by the dense forest stands which preclude easy access to all portions of the area. Driving for pleasure along the upper Stryker road, hunting, and berry picking are considered the primary forms of recreational use at the present time.

Grazing by livestock is not now permitted on the area.

Commercially valuable mineral deposits have not been located or developed.

IV. IMPACTS, BOTH BENEFICIAL AND ADVERSE

A. Forest Stand

The proposed Upper Stryker Ridge timber sale will be a major development activity which will utilize a portion of the existing timber volume and initiate more intensive timber management practices on this area. Existing timber stands, for the most part, consist of mature to overmature trees of declining vigor. As a result, these stands have an annual growth loss, due to various natural causes, that is greater than the annual increment. Stated another way, both the average merchantable board foot volume per acre and the total volume which is readily available from within the area are presently declining. The Upper Stryker Ridge sale is the initial step in reversing this trend by replacing a portion of the present stands with young vigorous stands.

Access roads provide the land manager with the opportunity to utilize and intensify his management of the timber resource. The road system planned for the Upper Stryker Ridge area has been designed not only to implement the sale, but to permit and facilitate future management actions. For example, the existence of a suitable road system will allow both salvage and timber stand improvement practices, neither of which is presently possible on those portions of the area which drain to the southwest and into Dog Creek.

B. Recreation

Improved and extended road access provided by this sale will also permit increased recreational use of the area. Recreational driving, hunting and berry picking are expected to increase somewhat as a result of this sale. Annual adverse snow conditions are such that the very limited snowmobile use of this area is not expected to increase.

C. Aesthetic

The type and degree of aesthetic impact which might be expected to result from this sale will depend principally on the time of year and the location and attitude of the observer. A view of the general sale area from a distance of approximately 2.5 miles is possible from U. S. Highway 93 (see photo 2, Appendix B). However, due to the design of the harvest units, the location of both harvest units and roads, and the low angle of view, the overall result is not anticipated to be visually displeasing. Special care has been taken to minimize adverse aesthetic impacts by establishing small, harvest units with irregular boundaries and which take advantage of the existing topography, and by capitalizing upon the screening effect provided by areas which are not designated for harvest. For example, roads were purposely located on benches and existing vegetation below roads left undisturbed where possible.

In addition, as a means to improve operating efficiency and reduce the adverse aesthetic impact associated with these areas, log landings will not be allowed within 100 feet of the main roads.

Aesthetic impact within the sale area itself will depend on the specifics of the situation. Aesthetic impacts will be greatest during road construction, harvesting, and slash disposal operations, and will gradually be reduced as the area is revegetated and returns to a more natural condition. Specific provisions to reduce adverse aesthetic impacts will be written into the sale contract.

D. Fish and Wildlife

Some disruption of the existing wildlife populations in the area is expected both during and after this sale. Spring, summer and fall big game populations in the area are relatively small due to the heavy, densely stocked forest stand. Nevertheless, big game use patterns within the area can be expected to be altered somewhat.

The amount of available big game forage should increase because of the type of cutting planned and the edge effect that is created. ^{3/} The small area of recognized winter game range within the sale boundary was purposely avoided in selecting the harvest units.

No rare or endangered species, with the possible exception of the Grizzly bear, is thought to occasionally use this area.

An increase in total water yield from the area can be expected as a result of this sale. Both erosion control measures taken in connection with this sale and the existing drainage facilities immediately below the sale area are expected to control the anticipated increase in surface runoff.

E. Economic

Economic analysis provides a means of comparing various alternatives and of placing the important factor of time into the analytical framework. Once a problem has been narrowed down to a finite number of alternatives it is possible to express some of the expected results in economic measures. These measures include such costs as setting up and administering the sale, timber revenues and employment effects. Not all expected impacts can be quantified, a fact which can be partially attributed to the non-market nature of some of the physical results. For example, the development of new roads may open up extensive areas for recreational use; a factor which many would label a benefit, although the state gains no revenue from increased public recreation.

^{3/} Aldo Leopold. 1933. Game Management. Charles Scribner and Sons. 481 pp.. illustrated.

These same roads lead to greater human use which may also drive out wildlife and reduce the quality of the recreational experience for the wilderness advocate; a factor some would call a cost, although it is equally difficult to quantify.

1. Internal Costs and Benefits

Considering the proposed sale from the viewpoint of the government of the State of Montana, there are certain "internal" costs and benefits which can be enumerated and quantified.

Internal Cost Summary

Sale Preparation	\$ 3,475
Sale Administration	3,300
Hazard Reduction (brush disposal)	15,050
Reclamation/reforestation	<u>17,900</u>
Total Costs	\$39,725

Internal Benefit Summary

Estimated Revenues, 4.633 MMBF Timber Sale	\$330,000
Other Assessments	32,950
Road Construction	59,580
Enhanced timber management <u>4/</u>	<u>?</u>
Total Benefits	\$422,530

2. Social Costs and Benefits

Not all effects of a timber sale are reflected in dollar costs or benefits to the government of the State of Montana. Furthermore not all can be quantified. These "social" costs and benefits are listed below.

Social Cost Summary

Increased soil erosion
Aesthetic losses
Air pollution-slash burning
Twenty-six acres permanently removed from timber production for roadways
Alteration of big game use patterns

4/ Since the stand proposed for sale is overmature and declining in value, the cutting and reforestation serve to enhance its long-term commercial productivity. The actual value of this enhancement is not presently known.

Social Cost Summary (Cont.)

Fuel and road oil consumption
41,500 gallons diesel fuel
7,000 gallons gasoline
22,500 gallons road oil
Increased recreation pressure on the natural system

Social Benefit Summary

The most significant social benefits are the primary and secondary employment and income effects. Primary employment and income effects are based on figures from a study by Polzin for Region One of the U. S. Forest Service. 5/ An employment multiplier for western Montana of 2.78 and an income multiplier of 3.29 were used for the analysis. 6/

Estimated direct employment--cutting, skidding, hauling, road construction, and processing	32.4 man-years
Estimated direct salaries and wages	\$275,400
Estimated secondary employment effect	57.6 man-years
Estimated secondary salary and wage effect	\$630,600
Increased recreation use	40 hunter-days/yr.
Increased water yield	148 A.F./yr. to zero over 30 yrs.
Increased production of big game forage	
Initiation of more intensive commercial management of the stand.	

Economic Summary

As a short-run action, the internal benefits far surpass the internal costs. After paying for road work and sale administration, an estimated \$330,000 will be turned over to the State Lands Department for the State School fund. Furthermore, the sale will result in an estimated 90 man-years of direct and indirect employment and \$906,000 in income. The sale will serve as the major feature of a management plan which will put this portion of State Forest land in a more productive posture.

5/ Polzin, Paul E. 1973. Economic Impact of Alternative Timber Harvest Schedules, Region 1, Missoula, Montana.

6/ Johnson, Maxine C. 1972. "Wood Products In Montana," Montana Business Quarterly.

Social impacts have been identified, including air pollution, soil erosion, increased recreational use, the estimated consumption of 71,000 gallons of petroleum products, and the permanent removal of 26 acres from timber production for roadways. Although analytical techniques are not available to express these impacts in economic terms, they may be significant.

V. LIST OF ALTERNATIVES

A wide variety of possible forest management alternatives was considered when this area was initially examined during the summer and fall of 1972. The evaluation was made by a team of resource specialists consisting of a landscape architect, soil scientist, hydrologist and forest management supervisor from the Division of Forestry. Based on their evaluations, work done by other members of the Division of Forestry and the technical input provided by other agencies, the management alternative embodied in this statement was developed.

A. General Alternatives

Three general alternatives are possible for the area comprising the proposed Upper Stryker Ridge timber sale. For purposes of this discussion, they have been termed the "do nothing," "status quo" and "intensive resource development and use" alternatives. The "do nothing" alternative in this case would involve withdrawing existing fire and resource protection activities. Maintenance of existing developments and salvage activities would be discontinued where feasible. Because such a course was considered a direct violation of both the trust and multiple-use mandates in existing State law, this alternative was rejected.

The "status quo" alternative was likewise rejected. Economic and social values will result from the utilization of a portion of the existing timber resource, while the productivity of the timber resource will be assured.

The alternative embodied in the proposed Upper Stryker Ridge timber sale represents in essence the decision to manage the timber resource on this area in such a manner that the productivity of the timber resource can be enhanced while minimizing adverse effects on other resource values. Given this perspective, the alternatives involved in the specific actions which compose the Upper Stryker Ridge timber sale can be examined.

A timber sale is in reality a coordinated series of separate but interrelated actions designed to accomplish one or more specific objectives. The Upper Stryker Ridge timber sale contract is the legal instrument which defines the particulars involved in these actions, sets the schedules to be followed and established the acceptable standards of performance. For discussion purposes, these actions will be considered under the headings of "Sale Design," "Road Construction and Improvement," "Harvesting Methods," and "Follow-up Activities."

B. Specific Alternatives

1. Sale Design

The design of a timber sale requires consideration of many factors, some of which are discussed or mentioned below. Basically, sale design involves trans-

forming specific management objectives into a sound, workable plan of action for an area. This involves a consideration not only of the present biological, social, economic and technological situations, but also of foreseeable future management activities and conditions in the area.

For example, given the existing biological condition of the forest stands on most of this area, a strong case can be made for a greater harvest area, larger individual units and more extensive road systems. From the standpoint of initiating healthy growing stands for future use, this is most desirable, but to do this forecloses the option of similar size periodic harvest and increases the magnitude of aesthetic, hydrologic and wildlife impacts.

2. Road Construction and Improvements

Alternatives considered, but rejected as acceptable, were the use of harvest systems requiring less road development, building both higher and lower standard road systems, and alternative locations to serve this area.

Alternative road improvement measures which were considered involved either no improvement to the existing system or that improvement which is necessary to mitigate the effects of the log hauling activity. The proposed Upper Stryker Ridge timber sale embodies the latter alternative. Photo 3 shows an existing road within the general sale area boundary which typifies those to be constructed. (See Appendix B)

3. Silvicultural Systems

The selection method, an uneven-aged reproduction method, involves the removal of the mature timber, usually the oldest or largest trees either as single scattered individuals or in small groups and repeated indefinitely at relatively short intervals. The selection method was judged unsuitable primarily because of the amount of forest debris already present and the higher proportion of the more shade tolerant tree species (which are lower in quality) that would result.

With respect to the number, size, shape and placement of specific unit boundaries, a variety of alternatives exist. Prime considerations in the determination of these units were the desire to mitigate the adverse visual impacts that often result from timber management activities, while at the same time to facilitate the harvesting and slash disposal operations.

4. The Harvesting Operation

The harvesting operation proposed for the Upper Stryker Ridge sale utilizes conventional crawler tractor and rubber-tired skidder logging systems. Various cable logging systems were considered as alternatives but, on the basis

of conditions which exist on a large proportion of the area, were judged unacceptable.

5. Followup Activities

Slash disposal will be performed by the State and consist of dozer piling and burning under favorable atmospheric conditions during the fall. Alternatives considered but rejected were: (1) no slash disposal activities within harvest units, (2) mechanical methods of slash disposal, and (3) broadcast burning. The first two alternatives were rejected because of the large amounts of slash and forest debris that would be present and the undesirable conditions for natural regeneration which would result. Broadcast burning was rejected because of increased risk to residual leave trees within many of the units, reduced scarification and more incomplete slash disposal during fall burning.

The possibility of spring and summer burning was considered. Although more favorable burning and unstable air conditions are more likely to be present, this alternative was rejected because of greatly increased risk of an uncontrolled fire situation resulting from hangover fires and the cost of necessary unit fireline construction, fire prevention patrol and fire mopup activities.

Artificial regeneration and such timber stand improvement activities as intermediate cuttings will be carried out as necessary.

VI. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

The purpose of this sale is to harvest certain mature and overmature stands on the area and replace them with healthy, vigorous, young stands of trees. The proposed Upper Stryker Ridge timber sale will result in a short-term decrease in the amount of timber readily available on the area. However, as a result of this action, the long term productivity of the area for harvestable tree growth should be increased.

Productivity of adjacent stands within the general sale area should also be improved in that better access will facilitate future salvage, harvest and improvement cuts. Future management cuts, with the exception of salvage cuts, will not be undertaken until new forest stands have become well established on harvest units created by the Upper Stryker Ridge sale.

Aside from these obvious effects upon commodity uses, there will likely be a short-term effect upon the other land uses, both consumptive and non-consumptive. During harvesting operations and prior to the slash clean-up, the aesthetic appeal will change. This change will be localized and short-term due to the size of the units, their location and the presence of screening vegetation. In the long-run, these factors, coupled with the fact that the forest is dynamic, will reduce the period during which aesthetic appeal is altered.

The proposed action is expected to disrupt big game use patterns within the area. However, in that critical wildlife habitat is not present and the big game population is small, the action is not expected to alter the long-term productivity of the wildlife resource.

The action is expected to increase the water yield from the area. As a result of varied topography, the yield will be spread throughout the runoff period; the increase will be greatest during the year after harvesting. The increase will be short-term and will decrease until evapotranspirative recovery from regeneration is complete. The recovery period has been estimated to be about 25 to 30 years.

As presently planned, the Upper Stryker Ridge timber sale will, in the short- and long-runs, stimulate and improve desirable tree growth within the commercial forest zone. Further, economic and social benefits will be provided through the utilization and perpetuation of a renewable resource, and present and future forest management activities will be facilitated.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Individual trees that are harvested and removed will for all practical purposes be irreversibly and irretrievably committed for the time period to replace them. The physical condition of many of these overmature trees is such that it is extremely unlikely that prudent management will be directed toward producing similar trees and stand conditions in the future on these productive sites.

The proposed extension of the Upper Stryker road systems and related road improvement activities represents for practical purposes the long term commitment of the roadbed to a use, which, by its nature, will reduce the future productivity.

VIII. AGENCIES, GROUPS AND INDIVIDUALS FROM WHOM COMMENTS HAVE
BEEN REQUESTED

Federal

Mr. A. B. Linford
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U. S. Soil Conservation Service
P. O. Box 970
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Mr. Ed Corpe, Supervisor
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Mr. Edwin Zaidlicz, State Director
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Mr. John M. Milodragovich
Chief, Division of Forest Management
U. S. Forest Service
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Missoula, MT 59801

Mr. John Fillmore
Chief, Division of State and Private Forestry
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State or Local Agencies

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Mr. Wesley R. Woodgerd, Director
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Mr. Steve Petrini
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Dean Robert Wambach
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Mr. Ted Schwinden, Commissioner
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Mr. Frank McChesney
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Dr. John Anderson, Director
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Mr. George B. Lackman, Comm.
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Mr. Robert E. Hall
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Mr. Torlief Aasheim, Chairman
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Montana State University
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Mr. Dale Burk
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Mr. Charles Lane, President
Montana Association of
Conservation Districts
Drummond, MT 59832

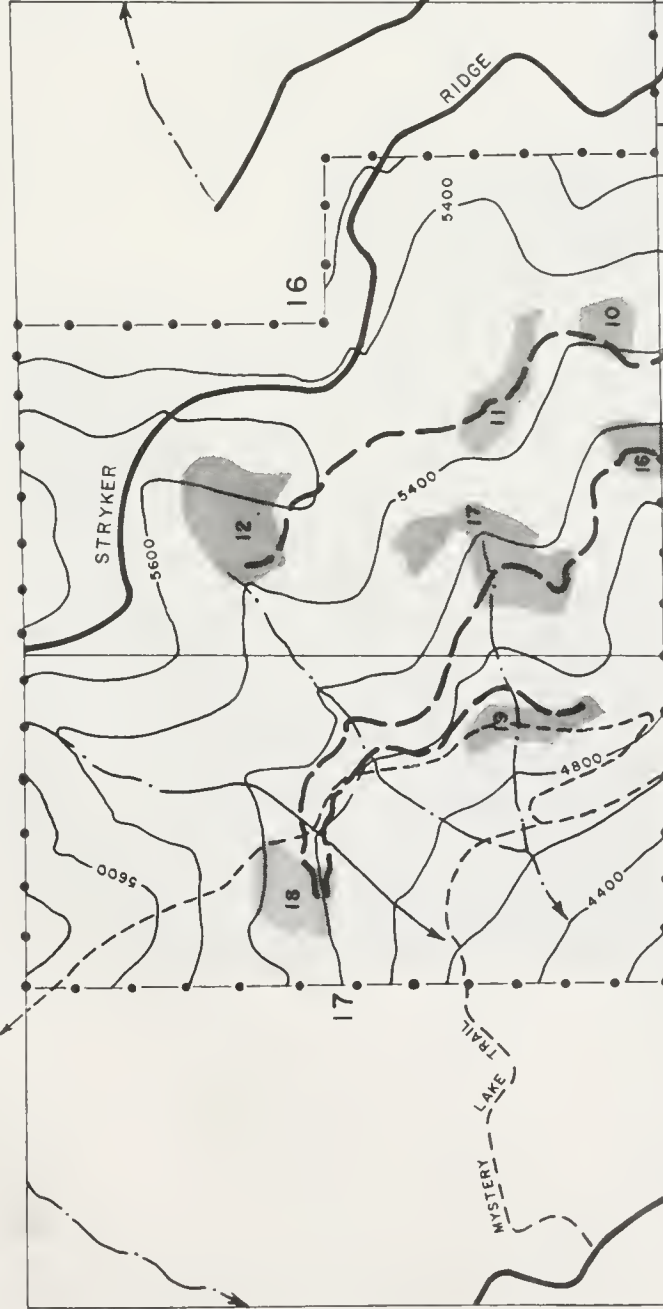
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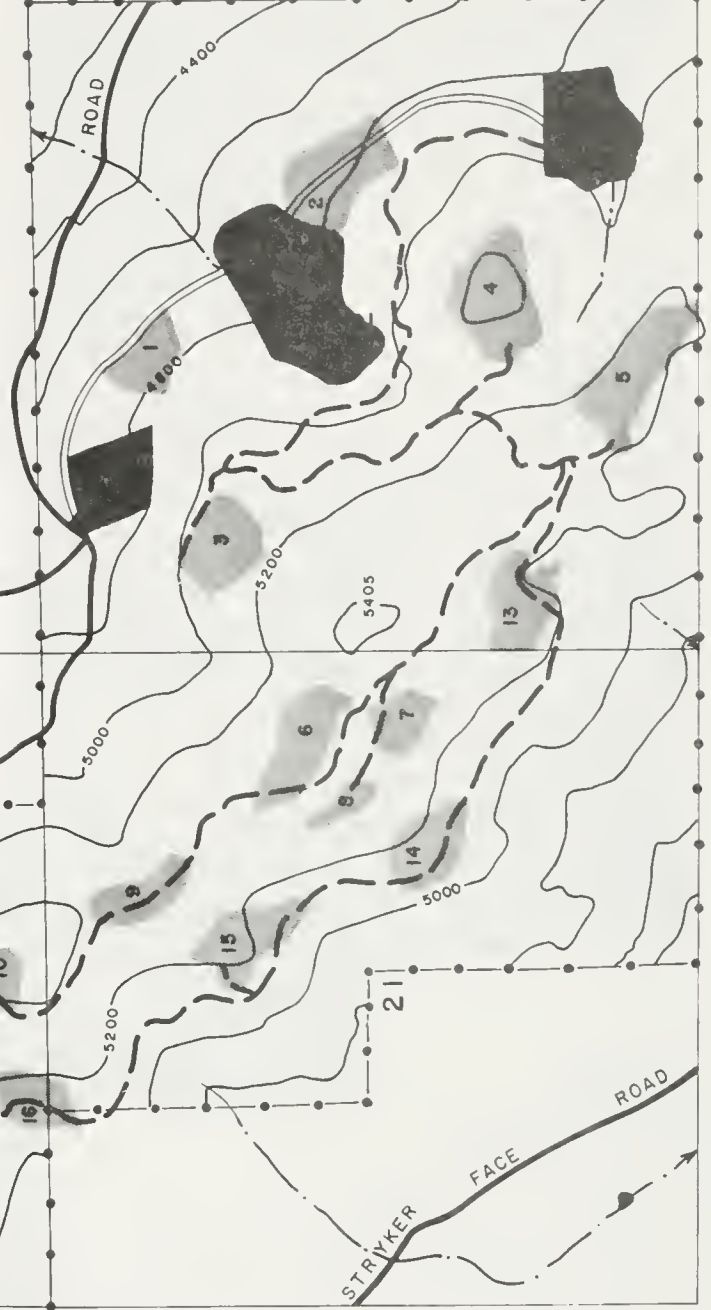
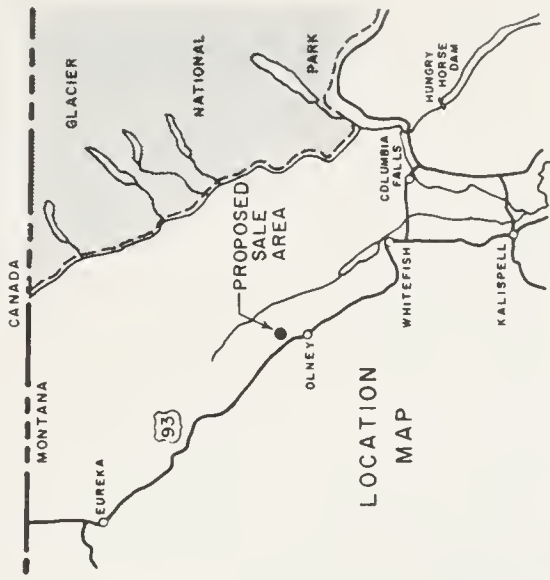
APPENDIX A

MYSTERY LAKE 0.20 MILE



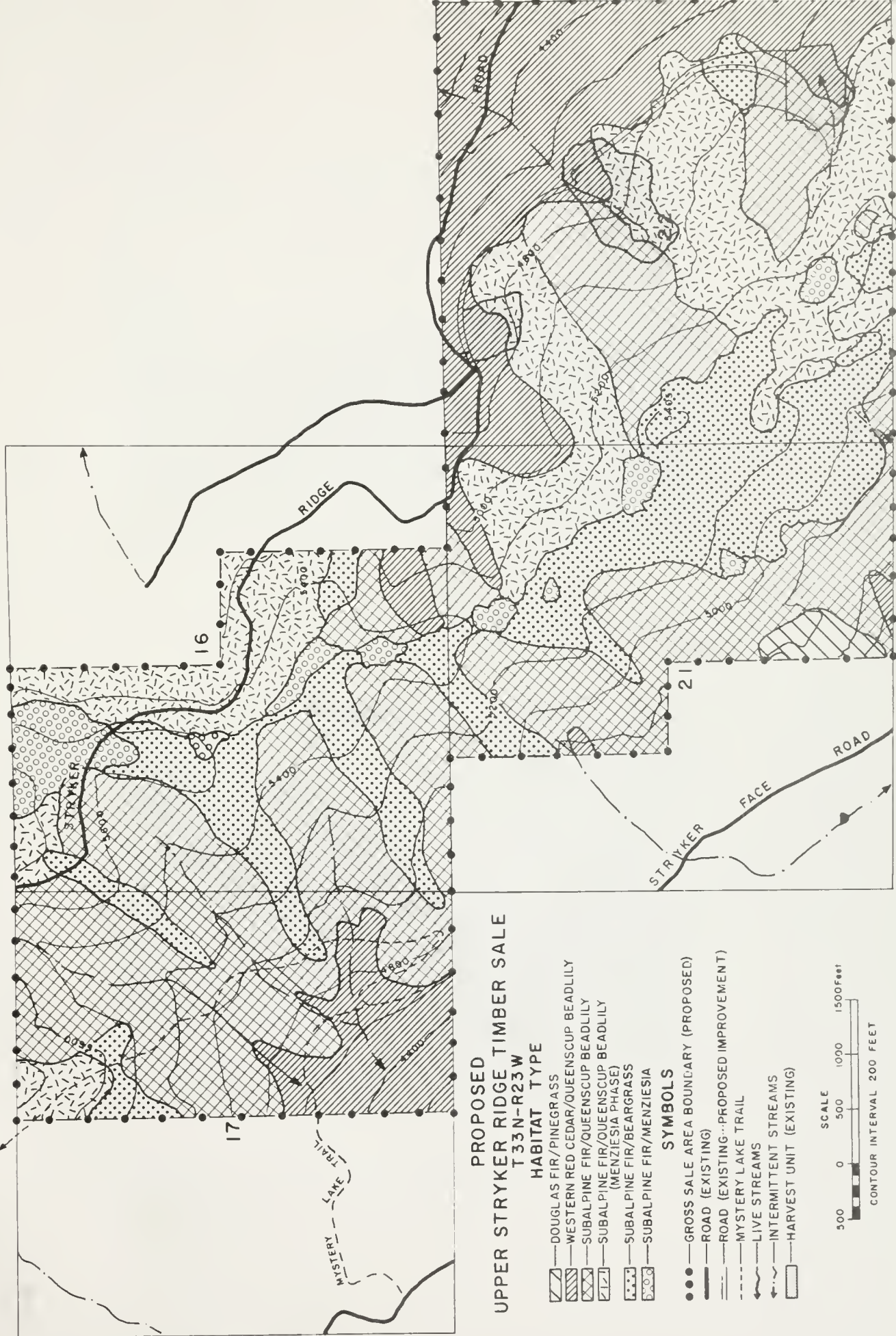
PROPOSED UPPER STRYKER RIDGE TIMBER SALE T 33N-R23W

- GROSS SALE AREA BOUNDARY (PROPOSED)
- ROAD (EXISTING)
- ROAD (EXISTING—PROPOSED IMPROVEMENT)
- ROAD (PROPOSED NEW CONSTRUCTION)
- MYSTERY LAKE TRAIL
- LIVE STREAMS
- INTERMITTENT STREAMS
- HARVEST UNIT (EXISTING)
- HARVEST UNIT (PROPOSED)





MYSTERY LAKE 0.20 MILE



PROPOSED UPPER STRYKER RIDGE TIMBER SALE T33N-R23W

HABITAT TYPE

- DOUGLAS FIR/PINEGRASS
- WESTERN RED CEDAR/QUEENSCUP BEADLILY
- SUBALPINE FIR/QUEENSCUP BEADLILY
- SUBALPINE FIR/QUEENSCUP BEADLILY (MENZIESIA PHASE)
- SUBALPINE FIR/BEARGRASS
- SUBALPINE FIR/MENZIESIA

SYMBOLS

- GROSS SALE AREA BOUNDARY (PROPOSED)
- ROAD (EXISTING)
- ROAD (EXISTING...PROPOSED IMPROVEMENT)
- MYSTERY LAKE TRAIL
- LIVE STREAMS
- INTERMITTENT STREAMS
- HARVEST UNIT (EXISTING)





APPENDIX B



Photo 1. General sale area located on background ridge.



Photo 2. Subalpine fir/queencup beadlelily habitat type. This vegetation type is generally characteristic of the forest condition within the sale area.



Photo 3. Present road in general sale area which typifies those to be constructed. Note screening vegetation on both sides.

